WILDFIRE: LESSONS LEARNED FROM THE 2017-2018 EVENTS

(& UPDATES)

BACE Spring Meeting – April 19, 2021

Wildfire: Lessons Learned

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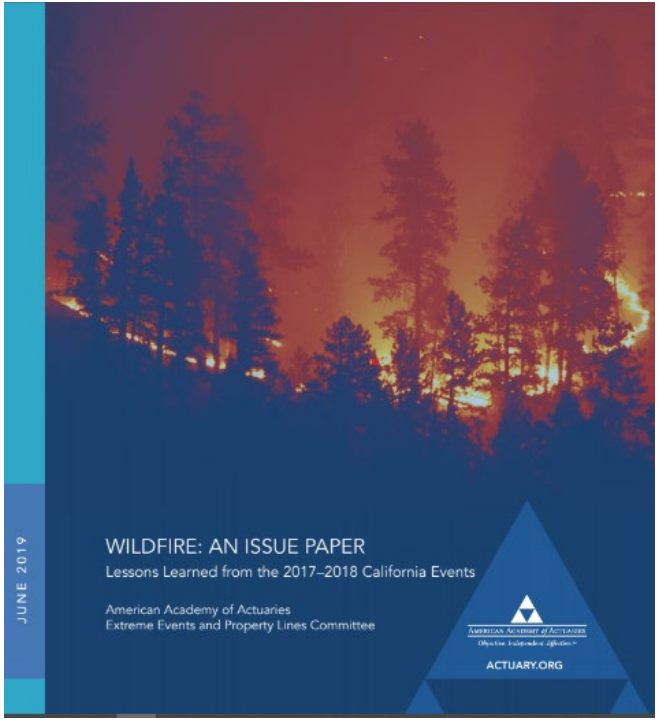
Wildfire: Lessons Learned



WILDFIRE: AN ISSUE PAPER
Lessons Learned from the 2017-2018 California Events

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Most Destructive Wildfires in California

- 8 of the 20 most destructive California wildfires in history occurred in 2017 or 2018
- 11 of the 20 most destructive California wildfires occurred in the last decade
- Top causes of these fires are powerline, electrical, and other human-related activity

Top 20 Most Destructive California Wildfires

	FIRE NAME *(CAUSE)*	DATE	COUNTY	ACRES	*STRUCTURES*	DEATHS
1	**CAMP FIRE** *(Powerlines)*	November 2018	Butte County	153,336	**18,804**	85
2	**TUBBS** *(Electrical)*	October 2017	Napa & Sonoma	36,807	**5,636**	22
3	**TUNNEL - Oakland Hills** *(Rekindle)*	October 1991	Alameda	1,600	**2,900**	25
4	**CEDAR** *(Human Related)*	October 2003	San Diego	273,246	**2,820**	15
5	**VALLEY** *(Electrical)*	September 2015	Lake, Napa & Sonoma	76,067	**1,955**	4
6	**WITCH** *(Powerlines)*	October 2007	San Diego	197,990	**1,650**	2
7	**WOOLSEY** (Under Investigation)	November 2018	Ventura	96,949	**1,643**	3
8	**CARR** *(Human Related)*	July 2018	Shasta County, Trinity County	229,651	**1,614**	8
9	**NUNS** *(Powerline)*	October 2017	Sonoma	54,382	**1,355**	3
10	**THOMAS** *(Powerline)*	December 2017	Ventura & Santa Barbara	281,893	**1,063**	2
11	**OLD** *(Human Related)*	October 2003	San Bernardino	91,281	**1,003**	6
12	**JONES** *(Undetermined)*	October 1999	Shasta	26,200	**954**	1
13	**BUTTE** *(Powerlines)*	September 2015	Amador & Calaveras	70,868	**921**	2
14	**ATLAS** *(Powerline)*	October 2017	Napa & Solano	51,624	**783**	6
15	**PAINT** *(Arson)*	June 1990	Santa Barbara	4,900	**641**	1
16	**FOUNTAIN** *(Arson)*	August 1992	Shasta	63,960	**636**	0
17	**SAYRE** *(Misc.)*	November 2008	Los Angeles	11,262	**604**	0
18	**CITY OF BERKELEY** *(Powerlines)*	September 1923	Alameda	130	**584**	0
19	**HARRIS** *(Undetermined)*	October 2007	San Diego	90,440	**548**	8
20	**REDWOOD VALLEY** *(Powerline)*	October 2017	Mendocino	36,523	**546**	9

Source: Cal Fire, 2019

Top 20 Most Destructive California Wildfires

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4	**CEDAR** *(Human Related)*	October 2003	San Diego	273,246	**2,820**	15
5	**NORTH COMPLEX** *(Under Investigation)**	August, 2020	Butte, Plumas, & Yuba	318,935	**2,352**	15
6	**VALLEY** *(Electrical)*	September 2015	Lake, Napa & Sonoma	76,067	**1,955**	4
7	**WITCH** *(Powerlines)*	October 2007	San Diego	197,990	**1,650**	2
8	**WOOLSEY** *(Under Investigation)*	November 2018	Ventura	96,949	**1,643**	3
9	**CARR** *(Human Related)*	July 2018	Shasta County, Trinity	229,651	**1,614**	8
10	**GLASS FIRE** *(Under Investigation)**	September 2020	Napa & Sonoma	67,484	**1,520**	0
11	**LNU LIGHTNING COMPLEX** *(Under Investigation)**	August 2020	Lake, Napa, Sonoma, Yolo & Solano	363,220	**1,491**	6
12	**CZU LIGHTNING COMPLEX** *(Lightning)*	August 2020	Santa Cruz, San Mateo	86,509	**1,490**	1
13	**NUNS** *(Powerline)*	October 2017	Sonoma	54,382	**1,355**	3
14	**THOMAS** *(Powerline)*	December 2017	Ventura & Santa Barbara	281,893	**1,063**	2
15	**OLD** *(Human Related)*	October 2003	San Bernardino	91,281	**1,003**	6
16	**JONES** *(Undetermined)*	October 1999	Shasta	26,200	**954**	1
17	**AUGUST COMPLEX** *(Under Investigation)**	August 2020	Mendocino, Humboldt, Trinity, Tehama, Glenn, Lake, & Colusa	1,032,649	**935**	1
18	**BUTTE** *(Powerlines)*	September 2015	Amador & Calaveras	70,868	**921**	2
19	**CREEK FIRE** *(Under Investigation)**	September 2020	Fresno & Madera	377,693	**856**	0
20	**ATLAS** *(Powerline)*	October 2017	Napa & Solano	51,624	**783**	6

Source: Cal Fire, 2021

Most Destructive Wildfires in California

- ~~8~~ 13 of the 20 most destructive California wildfires in history occurred from 2017-2020
- ~~11~~ 15 of the 20 most destructive California wildfires occurred in the last decade
- Top causes of these fires are powerline, electrical, and other human-related activity

Top 20 Largest California Wildfires

	FIRE NAME (CAUSE)	DATE	COUNTY	ACRES	STRUCTURES	DEATHS
1	**AUGUST COMPLEX** *(Under Investigation)**	August 2020	Mendocino, Humboldt, Trinity, Tehama, Glenn, Lake, & Colusa	**1,032,649**	935	1
2	**MENDOCINO COMPLEX** *(Under Investigation)*	July 2018	Colusa, Lake, Mendocino & Glenn	**459,123**	280	1
3	**SCU LIGHTNING COMPLEX** *(Under Investigation)**	August 2020	Stanislaus, Santa Clara, Alameda, Contra Costa, & San Joaquin	**396,624**	222	0
4	**CREEK FIRE** *(Under Investigation)**	September 2020	Fresno & Madera	**377,693**	853	0
5	**LNU LIGHTNING COMPLEX** *(Under Investigation)**	August 2020	Sonoma, Lake, Napa, Yolo & Solano	**363,220**	1,491	6
6	**NORTH COMPLEX** *(Under Investigation)**	August 2020	Butte, Plumas & Yuba	**318,930**	2,352	15
7	**THOMAS** *(Powerlines)*	December 2017	Ventura & Santa Barbara	**281,893**	1,063	2
8	**CEDAR** *(Human Related)*	October 2003	San Diego	**273,246**	2,820	15
9	**RUSH** *(Lightning)*	August 2012	Lassen	**271,911 CA / 43,666 NV**	0	0
10	**RIM** *(Human Related)*	August 2013	Tuolumne	**257,314**	112	0
11	**ZACA** *(Human Related)*	July 2007	Santa Barbara	**240,207**	1	0
12	**CARR** *(Human Related)*	July 2018	Shasta County & Trinity	**229,651**	1,614	8
13	**MATILIJA** *(Undetermined)*	September 1932	Ventura	**220,000**	0	0
14	**WITCH** *(Powerlines)*	October 2007	San Diego	**197,990**	1,650	2
15	**KLAMATH THEATER COMPLEX** *(Lightning)*	June 2008	Siskiyou	**192,038**	0	2
16	**MARBLE CONE** *(Lightning)*	July 1977	Monterey	**177,866**	0	0
17	**LAGUNA** *(Powerlines)*	September 1970	San Diego	**175,425**	382	5
18	**SQF COMPLEX** *(Lightning)*	August 2020	Tulare	**170,384**	228	0
19	**BASIN COMPLEX** *(Lightning)*	June 2008	Monterey	**162,818**	58	0
20	**DAY FIRE** *(Human Related)*	September 2006	Ventura	**162,702**	11	0

2017-2018 California Insured Losses: $25.4 Billion

	Number of Claims	# Claims resulting in Total Loss	Direct Incurred Loss (Millions)
Oct 2017 Wildfires	35,466	6,222	$10,401
Dec 2017 Wildfires	19,309	943	$1,883
Jan 2018 Mudslide	2,958	163	$736
Jul 2018 Wildfires	10,343	998	$934
Nov 2018 Wildfires	46,305	13,154	$11,430
Grand Total	**114,381**	**21,480**	**$25,384**

Source: California Department of Insurance, 2018

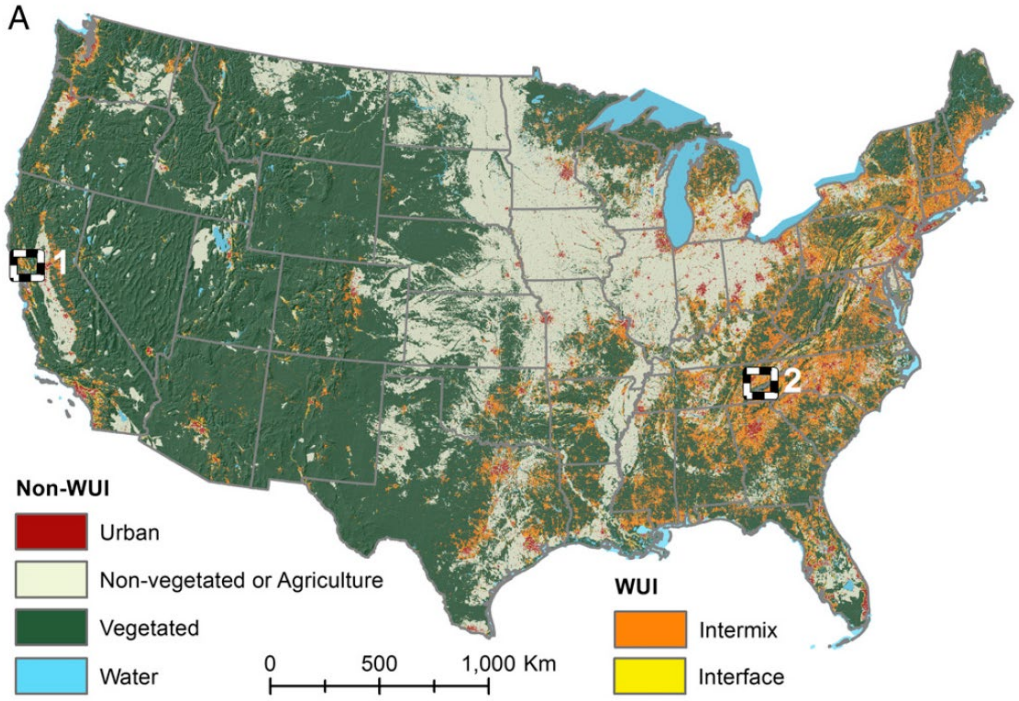
Top 10 States at High Risk to Extreme Wildfire

Rank	State	Estimated Number of Properties at Risk
1	California	2,019,800
2	Texas	717,800
3	Colorado	371,100
4	Arizona	237,900
5	Idaho	175,000
6	Washington	160,500
7	Oklahoma	153,400
8	Oregon	151,400
9	Montana	137,800
10	Utah	136,000

Source: Verisk, 2019

Source: Getty Images

Wildland Urban Interface

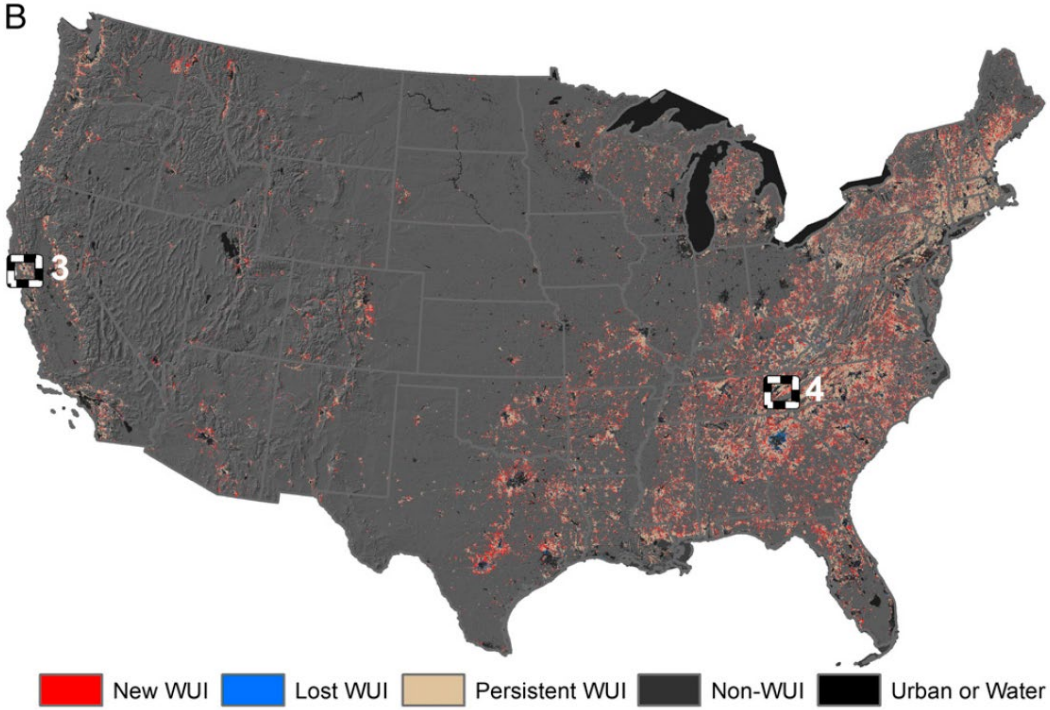


Wildland urban Interface (WUI): an area where human development is adjacent to or mixed in with undeveloped wildland

WUI covered 9.5% of the conterminous US in 2010

Source: Radeloff et al., Proceedings of the National Academy of Sciences 2018

Growth of the WUI from 1990 to 2010



From 1990-2010:

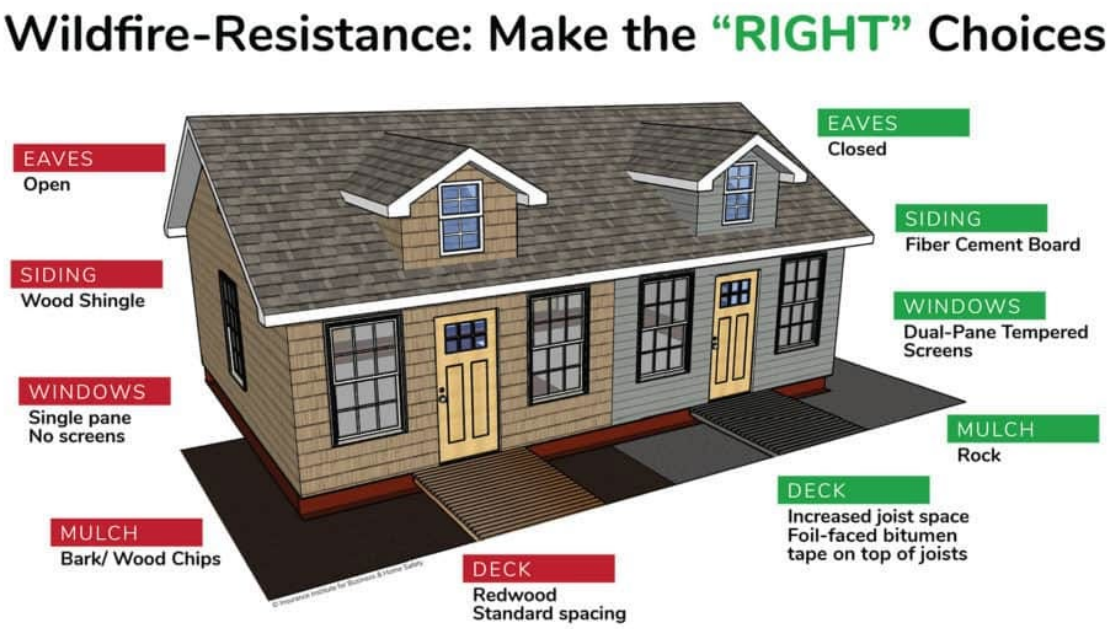
- Population in WUI increased 35% (73M to 98M)
- Number of houses in WUI increased 41% (31M to 43M)

Growth of the WUI causes 2 problems:

- More ignitions caused by humans
- Wildfires that occur will be closer to people and homes

Source: Radeloff et al., Proceedings of the National Academy of Sciences 2018

Mitigation and Resiliency in our Communities



Source: IBHS

1. Establish defensible space around homes
2. Spread awareness and prepare for wildfire risk
3. Provide retrofit incentives and resources
4. Extend wildfire building code requirements
5. Update building code requirements according to new research

Wildfire Catastrophe Modeling

Current State of Wildfire Modeling

- Wildfire modeling is complex due to the localized nature of wildfire exposure and losses
- Commercial stochastic models have been available in the marketplace for several years
- Recently released updates show that climate and weather are major influences affecting area burned in the US
- Use of wildfire modeling by insurers and regulators is limited

Image Source: Getty Images

Wildfire Catastrophe Modeling

Challenges

- Compounding high winds with other fuel factors
- Effectiveness of early detection and fire suppression efforts
- Uncertainty around human-related ignition
- Lack of comprehensive exposure data
- Incorporating the impacts of risk-mitigation efforts
- Post event factors: additional living expense, demand surge, building code changes, potential for subrogation, regulatory rulings

Image Source: Getty Images

Experience Rating vs. Exposure Modeling

- Many insurers are still relying on historical loss experience to price for wildfire risk
- In California, catastrophe loading is to be based on multi-year long-term average of catastrophe claims. For homeowners multiple peril fire, the number of years over which to average must be at least 20 years.

Source: Getty Images

Experience Rating vs. Exposure Modeling

- Consider:
  - Experience rating assumes the past is indicative of the future
  - Wildfire risk is changing due to WUI growth and climate change
  - Using long-term average may cause rate instability when significant events occur as in 2017 and 2018
- There is a need for wildfire catastrophe modeling

Regulatory and Legislative Actions 2017-2018, &2020

- Coverage to be provided for a combination of perils, e.g. mudslides, if wildfire is proximate cause (SB 917, approved 9/21/18)
- Promotion of wildfire mitigation and prevention (SB 901, approved 9/21/18)
- Insurers required to offer renewal of policy for at least next 2 renewal periods or 24 months, extend ALE from 24 to 36 months (SB 894, approved 9/21/18)
- Ceasing of moratoriums on writing policies in wildfire-impacted areas
- Extend amount of time the insured has to rebuild home from 2 to 3 years, and receive full replacement costs
- Expanded coverage for ALE and advance payment for contents
- Regulations on mitigation included in rating plans & models
- Technical Review Committee on WF RBC charge

Recommendations

- Wildfire Risk
- Mitigation
- Modeling

Source: Getty Images

Recommendations: Wildfire Risk

Wildfire risk landscape is evolving. Exposure to potential wildfire loss is increasing as a result of the changing wildland urban interface and climate risk.

- Promote awareness of the wildland urban interface among consumers
- Make available to the public a resource or tool that can provide a risk "score" for new home buyers

Recommendations: Mitigation

As wildfire risk exposure continues to grow, there is an increasing importance placed on recognizing and implementing ways to prevent and mitigate the risk.

- Enforce latest building codes
- Continue research on how to establish fire-resistant communities
- Perform regular inspections of homes in wildfire-prone areas
- Incorporate wildfire mitigation credits into rating plans

Recommendations: Modeling

Wildfire catastrophe modeling can reflect the current exposure and consider the full range of possible events.

- Study detailed claims from recent events to improve understanding of wildfire losses
- Increase stakeholders' confidence in wildfire modeling by increasing the transparency of model assumptions
- Establish generally accepted modeling standards for wildfire model review

Thank You